

Claims

1. A centrifugal separation rotor for centrifugal separation apparatus for separating
5 solid contaminants from a liquid,
the rotor comprising
a walled contaminant separation and containment vessel having a longitudinally
extending rotation axis, an impervious outer side wall extending about and along
the rotation axis spaced radially therefrom and at least one end wall extending from
10 the side wall towards the rotation axis,
outlet passage means, leading externally of the vessel, disposed radially inwardly
with respect to the outer side wall,
said walls defining radially inwardly from the outer side wall an annular
contaminant separation and containment zone and the outlet passage means
15 defining the radial boundary of the zone,
inlet means, arranged to receive liquid to be cleaned and convey it to the
contaminant separation and containment zone at a rate less than liquid can be
passed by the outlet passage means,
mounting means for mounting the rotor for rotation of the vessel about the
20 longitudinal rotation axis, and
fluid motor impeller means disposed to receive a jet of drive fluid thereagainst and
responsive to drive fluid impingement to rotate the rotor about said longitudinal
rotation axis,
said inlet means further comprising
25 a liquid inlet region, defined about and along the rotation axis by a divider
wall disposed radially between the outlet passage means and the rotation axis,
having a liquid inlet end,
transfer passage means, spaced from the inlet end, permitting liquid flow
between the inlet region and contaminant separation and containment zone, and
30 a collection face of said divider wall facing inwardly towards the rotation
axis,
characterised in that

the inlet means includes collection impeller means comprising
at least one collection impeller vane each vane upstanding with respect to the
divider wall collection face into the inlet region and extending about the rotation
axis and along the divider wall from said inlet end towards said transfer passage
5 means along a helical path, to constrain the liquid to be cleaned injected into the
inlet region to follow a helical path in the direction of rotation of the rotor inlet
means towards the transfer passage means.

- 10 2. A centrifugal separation rotor as claimed in claim 1 in which the fluid motor
impeller means comprises a plurality of motor impeller vanes disposed at or
adjacent the inlet end of the inlet means, each upstanding with respect to said
dividing wall collection face.
- 15 3. A centrifugal separation rotor as claimed in claim 2 in which the motor impeller
vanes extend about the rotation axis and along the divider wall from said inlet end
towards said transfer passage in the same directional sense as the collection
impeller vanes.
- 20 4. A centrifugal separation rotor as claimed in claim 3 in which the motor impeller
vanes each have a primary face facing in a direction towards the transfer passage
means and are arranged to receive drive fluid injected into the inlet region on said
primary face and deflect spent fluid in a direction between said collection impeller
vanes towards the transfer passage means.
- 25 5. A centrifugal separation rotor as claimed in any of the preceding claims in which
the helix pitch angle of each collection impeller vane is in the range 35 to 55°.
6. A centrifugal separation rotor as claimed in any of the preceding claims in which
the helix pitch angle of each collection impeller vane is substantially equal to 45°.
- 30 7. A centrifugal separation rotor as claimed in any one of the preceding claims in
which the rotor comprises an assembly of three integral mouldings of plastics

material, a first moulding comprising one end wall, the inner side wall and at least one collection impeller vane, a second moulding comprising an end wall and divider wall dimensioned to receive at least some of the impeller vanes in contact with the collection face thereof, at least one of said first and second mouldings including at least part of the outer side wall, and a third moulding comprising a mounting hub dimensioned to receive the inner side wall therearound .

8. A centrifugal separation rotor as claimed in any one of the preceding claims having at least one end wall thereof, extending from the outer peripheral wall towards the rotation axis, including outlet passage means and, between the outer peripheral wall and the outlet passage means of at least one end wall, a discharged liquid guide extending longitudinally with respect to a said end wall operable to inhibit contact between liquid discharged from the rotor vessel by way of the outlet passage means and the external surface of the rotor vessel radially outwardly of the discharged liquid guide.

9. A centrifugal separation rotor for centrifugal separation apparatus for separating solid contaminants from a liquid, the rotor comprising

a walled contaminant separation and containment vessel having a longitudinally extending rotation axis, an impervious outer side wall extending about and along the rotation axis spaced radially therefrom and at least one end wall extending from the side wall towards the rotation axis, including outlet passage means, leading externally of the vessel, disposed radially inwardly with respect to the outer side wall,

said walls defining radially inwardly from the outer side wall an annular contaminant separation and containment zone and the outlet passage means defining the radial boundary of the zone,

inlet means, arranged to receive liquid to be cleaned and convey it to the contaminant separation and containment zone,

fluid motor impeller means to rotate the rotor about said longitudinal rotation axis, and

characterised by a discharged liquid guide extending longitudinally with respect to a said end wall operable to inhibit contact between liquid discharged from the rotor vessel by way of the outlet passage means and the external surface of the rotor vessel radially outwardly of the discharged liquid guide.

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10. A centrifugal separation rotor as claimed in claim 8 or claim 9 in which the discharged liquid guide extends around the outlet passage means as a circumferentially complete skirt.

10 11. A centrifugal separation rotor as claimed in claim 10 in which the discharged liquid guide skirt is aligned with and comprises an extension of the outlet passage means.

15 12. A centrifugal separator comprising a housing including mounting means to support a rotor including a liquid separation and containment vessel for rotation about a rotation axis, drainage means to direct liquid exiting the vessel away from the rotor, fluid motor turbine means including drive fluid nozzle means operable to direct a stream of drive fluid to motor impeller vanes, and vessel supply means operable to direct liquid to be cleaned to the rotor vessel, characterised in that the
20 rotor comprises a rotor as claimed in any one of the preceding claims and the vessel supply means comprises liquid nozzle means operable to direct a free jet of said liquid to the inlet end of the inlet means.

25 13. A centrifugal separator as claimed in claim 12 in which the liquid nozzle means is arranged to direct said free jet of liquid to the inlet end of the inlet means directly or indirectly incident upon the primary face of each said collection impeller vane such that the collection impeller vanes function also as motor impeller vanes